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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
08/581,347	12/29/95	CLEEVES J	16820.P121

ID

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EXAMINER	
PORTNER, V	
ART UNIT	**PAPER NUMBER**
1645	21

DATE MAILED: 07/20/00

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary	Application No. 08/581,347	Applicant(s) Cleeves
	Examiner Portner	Group Art Unit 1645

X Responsive to communication(s) filed on *Apr 20, 2000* .

This action is **FINAL**.

Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire *3* month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

X Claim(s) *21-40* is/are pending in the application.

Of the above, claim(s) _____ is/are withdrawn from consideration.

Claim(s) _____ is/are allowed.

X Claim(s) *21-40* is/are rejected.

Claim(s) _____ is/are objected to.

Claims _____ are subject to restriction or election requirement.

Application Papers

See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

The drawing(s) filed on _____ is/are objected to by the Examiner.

The proposed drawing correction, filed on _____ is approved disapproved.

The specification is objected to by the Examiner.

The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

All Some* None of the CERTIFIED copies of the priority documents have been

received.

received in Application No. (Series Code/Serial Number) _____ .

received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

X Notice of References Cited, PTO-892

Information Disclosure Statement(s), PTO-1449, Paper No(s). _____

Interview Summary, PTO-413

Notice of Draftsperson's Patent Drawing Review, PTO-948

Notice of Informal Patent Application, PTO-152

--- *SEE OFFICE ACTION ON THE FOLLOWING PAGES* ---

DETAILED ACTION

Claims 21-40 are pending.

Continued Prosecution Application

1. The request filed on April 20, 2000 for a Continued Prosecution Application (CPA) under 37 CAR 1.53(d) based on parent Application No. 08/581,347 is acceptable and a CPA has been established. An action on the CPA follows.

Claim Rejections - 35 U.S.C. § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 38-39 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps are: the specific materials and methods steps for the making a semiconductor of claim 38, because the method of claim 21 only provides for the production of a component part of a semiconductor, specifically a semiconductor structure and claim 39 recites the step of making an electronic device, but what components and the arrangement of the components to make the electronic device are not distinctly claimed.

4. Claim 40 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention Claim 40 is in Jepsen claim format but the seal in the method of making a semiconductor structure has not been provided and therefore does not distinctly claim Applicant's invention. The only components provided are the substrate and a lower electrode and a gas feed through the lower electrode. The improvement has not been structurally defined in such a way as to define a positive recitation of a claim limitation and therefore does not distinctly claim the invention.

Specification

5. The use of the trademark "Kapton" has been noted in this application, specifically in claim 30. It should be capitalized wherever it appears and be accompanied by the generic terminology.

Although the use of trademarks is permissible in patent applications, the proprietary nature of the marks should be respected and every effort made to prevent their use in any manner which might adversely affect their validity as trademarks.

6. The recitation of Trademarks in the claims does not clearly define the invention because a trademark represents a product and not the specific components that constitute the product. Amendment of claim 30 to recite the material for the seal could obviate this objection.

Claim Rejections - 35 U.S.C. § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless --
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371© of this title before the invention thereof by the applicant for patent.

8. Claims 21-27, 29, 31-37, 40 are rejected under 35 U.S.C. 102(b) as being anticipated by Cathey, Jr. (US Pat. 5,096,536).

The instantly claimed invention is drawn to a method of making a semiconductor through the use of heat transfer in a plasma etching system for the production of semiconductor structure.

9. Cathey, Jr disclose a method and apparatus for the plasma etching of semiconductor materials (title), wherein the substrate surface is etched with simultaneous heat transfer for improved semiconductor production.

a.(instant invention claim 21) The heat transfer is accomplished through the use of a ring seal (col. 2, lines 37) and helium gas heat transfer which fills the vacuum voids between the wafer and the supporting electrode (col. 2, lines 30-31 and col. 2, lines 62-67).

b.(instant invention claims 22,29,31-33,36-37 and 40) The incorporation of a holding body into the etching assembly provides means for supporting the substrate and has an aperture for passing therethrough helium gas which effects the heat transfer(col. 5, lines 3-5). The

presence of the seal defines a space that affords for effective, substantially uniform heat transfer across the substrate because the gas is moved into the space and away from the substrate past the lower electrode so plasma etching a substrate results in an improved apparatus (col. 2, lines 62-68)

c. (Instant invention 23) The use of a mechanical clamping means is provided to position the substrate in place (col. 4, lines 16-30) or may utilize electrostatic clamping to hold the substrate in place (col. 6, lines 22-29).

d.(instant invention claim 24) The seal defines a distance between the wafers lower surface and the electrode of about 0.005 inches and therefore defines the seal with a thickness of approximately 125 microns (col. 4, lines 39-45).

e. (Instant invention claim 25 and 34)The seal is located at an outer peripheral portion with a shape that is in association with the outer peripheral portion of the substrate (labeled portion of figure,#20). The O-ring type seal are taught to be used in combination with lip-type seals and any other seals of a suitable configuration (col. 6, lines 38-41).

f. (Instant invention claim 26 and 35) The use of first and second seals provides for a substantially airtight system (see figures and col. 5, lines 19-35).).

g.(instant invention claim 27) The seal width is defined as the cross section of the O-ring and has the dimension of about 2.5 to 6.35 mm (.1 to .25 inches) and therefore discloses range that encompass the now claimed width of approximately 3 to 4 mm..

The reference inherently anticipates the now claimed invention.

Claim Rejections - 35 U.S.C. § 103

h. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

i. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cathey as applied to claims 21-27, 29, 31-37, 40 above in view of Meyer et al (US Pat. 5089880, issued 1992).

See discussion of Cathey above. Cathey teach the production of semiconductors in an improved temperature controlled system, wherein the system comprises the use of seals that provide for the uniform transfer of heat using helium gas, but differs from the instantly claimed invention by failing to show the thickness of the substrate upon which the semiconductor is made, specifically 25-125 microns.

Meyer et al disclose the use of a wafer substrate in the production of a semiconductor with a thickness of approximately 75-175 microns (col. 8, lines 64-67) in an analogous art for the purpose of making semiconductors in a pressurized interconnection system.

Therefore, it would have been obvious to the person of skill in the art at the time the invention was made to use a substrate of a thickness of about 75-125 microns in the method of Cathey because Meyer teaches that semiconductor substrates may have a thickness 75 to 125

microns and provided a surface upon which a semiconductor was successfully produced. The person of ordinary skill in the art would have been motivated by the reasonable expectation of success of using a substrate of 75-125 microns because the size substrate had been successfully used in the production of a semiconductor by Meyer.

j. Claim 21 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cathey in view of Horiuchi et al (US Pat. 4,931,135) .

See discussion of Cathey above. Cathey teach the use of a polymeric material in the production of the seal members but differs from the instantly claimed invention by failing to show the use of Kapton (also known as Capton and polyimide) as the polymeric material to make the seal.

Horiuchi et al show the use of polyimide in an analogous art for the purpose of producing a sheet-like synthetic polymer film located between electrode and a semiconductor substrate mounting surface to provide uniform an impedance between substrate and electrode for holding it. semiconductor wafer is fixed on a projecting mounting, wherein a cooling gas is supplied from the cooling gas supply source (not shown) to a gap between semiconductor substrate and synthetic polymer film through cooling gas supply pipe and hole at a predetermined pressure and a predetermined flow rate of, e.g., several cc/min, thereby cooling the bottom surface of substrate. As a result, temperature uniformity of substrate can be improved to improve the etching uniformity.

k. It would have been obvious to the person of ordinary skill in the art at the time the invention was made, to utilize polyimide as taught by Horiuchi as the polymer in method of making a semiconductor as taught Cathey, because Horiuchi et al teach that polyimide provides a seal type film that is formed a heat-resistant polyimide resin having a thickness of about 20 to 100 .mu.m and adhered on the mounting surface of electrode by a heat-resistant acrylic resin adhesive and would serve to aid in the transfer of heat and a cooling gas is supplied from the cooling gas supply source to a gap between semiconductor substrate and synthetic polymer film through cooling gas supply pipe and hole at a predetermined pressure and a predetermined flow rate of, e.g., several cc/min, thereby cooling the bottom surface of substrate which results in temperature uniformity of substrate can be improved to improve the etching uniformity. Therefore, the person of ordinary skill in the art at the time the invention was made would have been motivated by the reasonable expectation of success of obtaining improved etching uniformity utilizing a polyimide surface because the polymer film provides a means for controlling pressure of the cooling gas supply and a means for temperature uniformity of the substrate due to transfer of heat to the cooling gas. If applicants contend that this is not the case, applicants are advised that the Office does not have the facilities for examining and comparing applicant's product with the prior art, and that the burden is on applicant to show a novel or unobvious difference between the claimed method and the method of the prior art. See In re Best, 562 F.2d 1252, 195

USPQ 430 (CCPA) and Ex parte Gray, 10 USPQ 2d 1922 1923 (PTO Bd. Pat. App. and Int.)

Conclusion

l. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

m.Herchen (US pat 5,870,271) is cited to show a pressure activated sealing diaphragm for chucks.

n.Blalock et al (US Pat. 5,711,851) is cited to show a process for improving the performance of a temperature etch process.

o.Ishii (US Pat. 5,529,657) is cited to show a plasma processing apparatus for making a semiconductor.

10.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ginny Portner whose telephone number is (703)308-7543. The examiner can normally be reached on Monday through Friday from 7:30 AM to 5:00 PM except for the first Friday of each two week period.

If attempts to reach the examiner by telephone are unsuccessful. the examiner's supervisor. Lynette Smith, can be reached on (703) 308-3909. The fax phone number for this group is (703) 308-4242.

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SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1600

The Group and/or Art Unit location of your application in the PTO will be Group Art Unit 1645. To aid in correlating any papers for this application, all further correspondence regarding this application should be directed to this Art Unit.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 308-0196.

Vgp
July 14, 2000

LYNETTE R. F. SMITH
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